

What is claimed is:

- 1 1. A heat pipe assembly comprising:
2 a combined reservoir and evaporator; and
3 a condenser having a condensate artery returning condensate to the reservoir.
- 4 2. The heat pipe assembly as in claim 1, further comprising:
5 the evaporator having a passage as part of the condensate artery.
- 6 3. The heat pipe assembly as in claim 1, further comprising:
7 the evaporator having a porous wick.
- 8 4. The heat pipe assembly as in claim 1, further comprising:
9 the evaporator having a wick forming an end of the reservoir.
- 10 5. The heat pipe assembly as in claim 1, further comprising:
11 the evaporator having a porous wick; and
12 the condensate artery being coupled to a wick passage extending through the wick.
- 13 6. The heat pipe assembly as in claim 1, further comprising:
14 the condenser having an annular space surrounding the artery, the annular space
15 collecting agglomerated slugs of condensate bridging across the annular space.
- 16 7. The heat pipe assembly as in claim 1, further comprising:
17 a thermo-electric cooler connected to the reservoir and the evaporator.
- 18 8. The heat pipe assembly as in claim 1, further comprising:
19 a fan supplying supplemental cooling of the reservoir.
- 20 9. The heat pipe assembly as in claim 1, further comprising:
21 the evaporator having a porous wick and ducts of a vapor manifold that exhausts to the
22 condenser.

- 23 10. The heat pipe assembly as in claim 1, further comprising:
24 a hollow tube imbedded in the evaporator as part of the artery, and a passage extending
25 from the tube to the reservoir.
- 26 11. The heat pipe assembly as in claim 1, further comprising:
27 an initially open end of the condenser providing a site for evacuating the heat pipe
28 assembly and for backfilling a quantity of working fluid in the artery.
- 29 12. The heat pipe assembly as in claim 1, further comprising:
30 the condensate artery being coupled to a hollow pipe that is imbedded in the evaporator.
- 31 13. The heat pipe assembly as in claim 1, further comprising: a secondary wick extending
32 into the reservoir.
- 33 14. The heat pipe assembly as in claim 1, further comprising: a secondary wick unitary with a
34 remainder of the wick, the secondary wick extending into the reservoir.
- 35 15. A method of making a heat pipe assembly, comprising the steps of:
36 making a combined reservoir and evaporator wick;
37 connecting a liquid return artery and a liquid return passage extending through the
38 evaporator wick;
39 surrounding the artery and the combined reservoir and evaporator wick with an outer
40 tube; and
41 sealing the outer tube after evacuating the outer tube and back filling the liquid return
42 artery with a quantity of working fluid.
- 43 16. The method of claim 15, and further comprising the steps of:
44 forming a wick extension of the evaporator wick; and
45 extending the wick extension into the reservoir.
- 46 17. The method of claim 15, and further comprising the step of:

47 forming a vapor manifold in the wick; the vapor manifold communicating with the
48 condenser.

49 18. The method of claim 15 wherein, the step of making a combined reservoir and evaporator
50 wick, further comprises the step of; sintering the evaporator wick in situ within an external tube
51 section of the heat pipe assembly, while forming an end of the reservoir with the evaporator
52 wick.

53 19. The method of claim 18, and further comprising the step of: forming a vapor manifold in
54 the wick, the vapor manifold communicating with the condenser.

55 20. The method of claim 18, and further comprising the steps of:
56 forming a wick extension of the evaporator wick; and
57 extending the wick extension into the reservoir.